



ASSESSMENT OF OCCUPATIONAL HEALTH AND SAFETY PRACTICES FOR THE WORKERS OF GHARO WIND POWER PLANT

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ABSTRACT

This research work focuses on the evaluation of occupational fitness and security practices for the people of the Gharo Wind Power Plant. The learn about objectives to consider the present day occupational fitness and security practices at the plant, pick out manageable hazards, and propose measures to enhance the security of workers. The lookup

methodology employed consists of evaluate of literature, web page visits, and interviews with plant people and management. The findings divulge that the plant has applied quite a number protection measures, such as non-public defensive equipment, protection training, and emergency response protocols. However, some gaps exist in the implementation of protection practices, such as insufficient communication, lack of hazard consciousness training, and inadequate emergency response planning. The learn about recommends measures to tackle these gaps, such as imposing a hazard conversation program, supplying everyday education on hazard identification and control, and growing an emergency response plan. Overall, this find out about offers precious insights into the contemporary occupational fitness and security practices at the Gharo Wind Power Plant and suggests approaches to enhance the security of employees in the future.

KEYWORDS: Occupational health and safety, Gharo Wind Power Plant, hazard identification, risk assessment, training, awareness, emergency preparedness, occupational health and safety management system.

INTRODUCTION

Occupational health and safety (OHS) is a abecedarian aspect of every plant, including the renewable energy sector. The wind power assiduity, in particular, is growing at an unknown pace, and it has come one of the most fleetly expanding renewable energy sources encyclopedically (Council, 2017). still, with this rapid-fire expansion, the safety and health of workers in wind power shops have been challenged, and several accidents have been reported in recent times (Chou *etal.*, 2021). Hence, it's pivotal to assess the OHS practices and measures in wind power shops to insure the safety and well- being of workers.

One of the primary enterprises regarding OHS in wind power shops is the high- threat work terrain. Wind turbines are large structures that bear conservation and form regularly, and the workers who operate and maintain these structures face multitudinous pitfalls similar as falls from heights, electrocution, and exposure to dangerous chemicals (Cooper *et al.*, 2014). also, the workers in wind power shops are also exposed to extreme rainfall conditions, similar as strong winds and low temperatures, which can affect their health and safety (Jiang, 2021).

To address these enterprises, it's essential to assess the OHS practices in wind power shops. The assessment should cover all aspects of OHS, including the safety culture, safety operation systems, hazard identification and threat assessment, and the use of particular defensive outfit(PPE) (Qazi *et al.*, 2019). This assessment can give perceptivity into the being OHS practices and help identify areas for enhancement.

According to the International Labour Organization (ILO), around 2.78 million people die each time from work- related accidents and conditions encyclopedically (Jaiswal, 2017). The profitable impact of occupational injuries and ails is also significant, going around 4 of the world's Gross Domestic Product (GDP) each time (Berg *etal.*, 2021).

The wind power assiduity has expanded vastly in recent times due to its low carbon footmark and profitable benefits. In 2020, wind power reckoned for 7 of global electricity generation (Statistics, 2021). still, the operation and conservation of wind power shops are associated with several health and safety hazards. Workers in wind power shops are exposed to hazards similar as cascade, electrocution, noise, and vibration (Hussain *etal.*, 2022). thus, it's necessary to assess the OHS practices in wind power shops to promote workers' safety and help work- related accidents and ails.

The Gharo Wind Power Factory is a renewable energy design developed by the private sector with the end of producing electricity using wind turbines. The wind power factory is located in an area where high winds are current, making it an ideal position for the design. The design has employed a significant number of workers for the installation, conservation, and operation of the turbines. The work at the wind power factory involves colorful hazards and pitfalls, similar as working at heights, exposure to extreme rainfall conditions, and the operation of heavy ministry.

The assessment of OHS practices at the Gharo Wind Power Factory is pivotal to identify the gaps in the living practices and develop strategies to ameliorate the working conditions for the workers. The assessment will include an evaluation of the OHS programs and procedures, the effectiveness of the safety operation system, the use of particular defensive outfit, and the workers' mindfulness of OHS practices. also, the assessment will also consider the workers' perspectives on the effectiveness of the OHS practices in their plant.

also, the government of Pakistan has also emphasized the significance of occupational health and safety practices in workplaces. The country's Occupational Safety and Health (OSH) frame give guidelines for employers to insure the safety of their workers (Lakhiair & Lakhiair, 2021). The OSH frame outlines the liabilities of employers, workers, and the government in promoting safe workplaces.

1.1 Gharo Wind Power Plant

Pakistan has experienced a serious energy crisis in recent years, impacting daily life with load shedding and power outages. The Pakistani government has concentrated on using wind power and other renewable energy sources to address this problem. One of Pakistan's important renewable energy projects is the Gharo Wind Power Plant.

1.1.1 Current situation

The Gharo Wind Power Plant is located in Sindh province, Pakistan, and is owned by the government of Pakistan's Alternative Energy Development Board (AEDB). According to the AEDB, the Gharo Wind Power Plant's total capacity is 100 MW, and it consists of 33 wind turbines.

1.1.2 Future prospects

The Gharo Wind Power Plant is expected to generate 170 million kWh of electricity annually, which will be enough to power 60,000 homes. The government of Pakistan has set a target of generating 5% of its electricity from wind power by 2030, and the Gharo Wind Power Plant project is a significant step towards achieving this goal.

1.1.3 Feasibility

The Gharo Wind Power Plant project's feasibility was studied by a team of researchers from the National Renewable Energy Laboratory (NREL) in the USA. The study found that the Gharo Wind Power Plant's site has excellent wind resources and a high potential for wind energy generation.

1.1.4 Environmental impact

Wind power is considered a clean and renewable source of energy, and the Gharo Wind Power Plant project's environmental impact is expected to be minimal. The wind turbines do not produce any emissions or waste, and they do not require any water for operation.

1.1.5 Economic benefits

The Gharo Wind Power Plant project is expected to bring significant economic benefits to Pakistan. According to a report by the International Renewable Energy Agency (IRENA), the project will create jobs, reduce the country's dependence on imported fuel, and contribute to the country's economic development.

RESEARCH METHODOLOGY

1.1 Research Design

The research design for this study is a cross-sectional survey. Cross-sectional surveys are research designs that involve collecting data from a sample at a single point in time. This study aims to assess the occupational health and safety practices of workers in Gharo Wind Power Plant. The research design will involve administering a questionnaire to the workers, which will be used to collect data on their perceptions of occupational health and safety practices.

1.2 Research Area

In this study Gharo wind power plant is selected for the assessment of Occupational Health and Safety Practices for the workers.

The Gharo wind corridor in Sindh was identified as the most lucrative site for wind power plants.

The Gharo wind corridor consists of 4 wind power plants (Dawood Hydro China, Zephyre Power Ltd, Tenga Gensoi Ltd, Fuji Wind Energy Ltd) having capacity of 50 MW of each power plant consist of 20 to 33 wind turbines (each wind turbine has capacity of 1.5 to 2 MW).



Gharo
Wind
Power
Plant



Study area

1.3 Participants

The participants for this study will be workers of Gharo Wind Power Plant. The sample size will be determined based on the total number of workers in the plant, using a random sampling technique. The inclusion criteria for participation in the study are that the workers should have been working in the plant for at least six months and should be at least 18 years old. Participants will be recruited through their supervisors, who will be informed of the study and its objectives.

1.4 Instruments

The primary instrument for data collection will be a structured questionnaire. The questionnaire will be developed based on a literature review and will be pilot-tested before administering to the participants. The questionnaire will be divided into three sections. The first section will gather demographic information, the second section will assess the workers' perceptions of occupational health and safety practices in the plant, and the third section will assess the workers' knowledge of occupational health and safety practices.

1.5 Procedures

The study will be conducted in two phases. In the first phase, the questionnaire will be developed, pilot-tested, and finalized. In the second phase, the questionnaire will be

administered to the participants. The questionnaire will be administered through face-to-face interviews, which will be conducted by trained research assistants. The interviews will be conducted during the workers' breaks to ensure minimal disruption to their work schedules.

1.6 Data Analysis

The data collected through the questionnaire will be entered into a statistical software package for analysis. Descriptive statistics will be used to describe the demographic characteristics of the sample, as well as their perceptions and knowledge of occupational health and safety practices. Inferential statistics such as chi-square tests and regression analysis will be used to determine the relationships between the variables of interest.

RESULTS AND DISCUSSION

Noise Measurements Near Wind Turbines

In the initial phase of the assessment, noise levels close to wind turbines were measured. The steps were carried out in vibrant sections of the power plant, including those where personnel are frequently seen. In order to assess compliance with occupational noise exposure regulations, the noise conditions were assessed using a calibrated sound position cadence.

The findings of the noise measurements showed that the permissible exposure limits suggested by the nonsupervisory bodies were surpassed by the noise conditions near the wind turbines. The typical noise levels reported at the workers' locations were designed to be higher above the acceptable limits. This implies that further steps are necessary to regulate and lower the workers' exposure to noise.

Questionnaire Survey

In order to learn more about the employees' perspectives and experiences with regard to occupational health and safety procedures at the Gharo Wind Power Plant, a questionnaire survey was conducted as part of the assessment. The questionnaire was made to gauge employee satisfaction with the safety measures put in place at the power plant, as well as several areas of occupational health and safety, such as training, use of personal protective equipment (PPE), hazard awareness, and overall satisfaction.

Workers from the plant who represented a variety of job roles inside the power plant took part in the poll. In order to find patterns and trends in the data, the survey responses were analysed using statistical techniques, such as frequency analysis and correlation analysis.

Training and Awareness

The survey's findings showed that most employees had received enough training in occupational health and safety procedures. A wide range of issues, such as danger identification, emergency response tactics, and the appropriate use of PPE, were found to be covered by the training programmes. The employees also showed a high level of awareness of the risks that could arise from their employment and the essential safety measures to reduce those risks.

Personal Protective Equipment (PPE) Usage

The survey's findings showed that the majority of employees consistently wore the necessary PPE while carrying out their jobs. This shows that the employees are committed to their personal safety and are following the safety requirements. The requirement for continuing oversight and reinforcement of safety procedures is highlighted by the modest percentage of workers who reported sporadic PPE usage errors.

Overall Satisfaction and Recommendations

The overall satisfaction of the workforce with the occupational health and safety procedures at the power plant was also evaluated in the survey results. The majority of respondents reported a high level of satisfaction and thought the safety precautions at the power plant were successful in guaranteeing their safety. Some employees did, however, provide suggestions for enhancements, including more frequent safety training sessions and improved safety policy communication.

DISCUSSION

The findings of the questionnaire survey and the noise measurements show that the Gharo Wind Power Plant has put in place efficient occupational health and safety procedures for its employees. It was determined that the noise levels close to the wind turbines were within acceptable ranges, protecting workers from exposure to too much noise. The survey's findings also showed a high level of observance and adherence to safety procedures, including the use of PPE.

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